Remarks/Arguments

I. Status of the Claims

In the third final Office Action, the Examiner indicated that claims 41-50 are pending, and rejected claims 41-50 variously under 35 U.S.C. §103(a).

Claims 1-40 stand canceled.

Claims 41-50 are pending for reconsideration.

This patent application has had a long and tortuous prosecution history since it was filed on October 12, 2001. In particular, the Applicants have responded to the Examiner's various Office Actions with the following:

Response to Restriction Requirement (January 21, 2004)

Amendment (June 4, 2004)

Amendment (September 8, 2004)

Amendment After Final (January 13, 2005)

Amendment (April 7, 2005)

Amendment After Final (September 22, 2005)

Appeal Brief (December 27, 2005)

Amended Appeal Brief (March 31, 2006)

Amendment (July 24, 2006)

Amendment After Final (November 17, 2006)

In these numerous responses the Applicants have made an earnest effort to move the patent application to issue. In this regard, the claims in the patent application have been repeatedly amended to better define over the numerous prior art references that the

Examiner has applied against the claims over the course of the last several years. Moreover, the number of pending claims is limited to ten so as to limit the number of issues under consideration. In view of this history, the Applicants request that the Examiner revisit and carefully reconsider the pending claims (i.e., claims 41-50) in light of the following arguments.

II. Rejection of Claims 41-44 Under 35 U.S.C. §103(a)

At pages 4-5 of the third final Office Action, claims 41-44 are rejected under 35 U.S.C. §103(a) as being unpatentable over Hartog et al. (U.S. Patent No. 6,236,542) in view of Roberts (U.S. Patent No. 5,723,181).

The Applicants respectfully submit that the Hartog et al. and Roberts references, alone and in combination, fail to disclose or suggest the invention as recited in claims 41-44.

Independent claim 41 is directed to the **"precipitated"** surfactant embodiments of the present invention. In this regard, independent claim 41 requires specific interaction between a surfactant and a substrate that is a glass disk substrate, a ceramic disk substrate, or a glass-ceramic disk substrate for use in a data storage device. The specific interaction claimed is that the surfactant is precipitated onto a surface of at least one of the substrate and the colloidal particles, and that the surfactant has a hydrophobic section that forms a steric hindrance barrier between the substrate and the colloidal particles.

Neither the Hartog et al. reference nor the Roberts reference discloses or suggests that a surfactant is precipitated on a surface of a substrate and/or colloidal particles as

required by independent claim 41. These references are, in fact, completely devoid of any mention of a precipitated surfactant.

A combination of factors (e.g., surfactant type, the pH of the self-cleaning slurry composition, and the identity of the substrate and/or colloid) must be present for precipitation to occur. See, for example, the discussion of precipitating an anionic surfactant on the substrate and/or colloidal surfaces at page 22, line 24 through page 23, line 2 of the present application. Such a combination of factors is proposed by the Examiner, but only though the application of forbidden hindsight in modifying the Hartog et al. reference to incorporate a particular surfactant taught in the Roberts reference.

The teaching or suggestion to make the claimed modification and the reasonable expectation of success must be found in the prior art, not applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). With regard to independent claim 41, the appellant respectfully submits that the teaching or suggestion to make the claimed modification and the reasonable expectation of success are based on impermissible hindsight gleaned from the appellant's disclosure, not the prior art. It is improper to use the inventor's patent application as an instruction book on how to reconstruct the prior art. *Panduit Corp. v. Dennison Mfg. Co.*, 810 F.2d 1561, 1 USPQ2d 1593 (Fed. Cir. 1987).

The Hartog et al. reference and the Roberts reference, alone and in combination, fail to teach the use of a surfactant to form a steric hindrance barrier between a substrate and colloidal particles. Although the Roberts reference teaches the addition of sodium octyl sulfate to its hydrophilizing composition as a preferred surfactant to speed up the hydrophilizing composition's function of rendering surfaces hydrophilic, the purpose of

the addition of sodium octyl sulfate in the Roberts reference is inapplicable to the superpolishing process and slurry disclosed in the Hartog et al. reference. Robert's teaching of adding sodium octyl sulfate to its hydrophilizing composition to speed the formation of a hydrophilic surface on hydrophobic surfaces, such as synthetic fibers and wax, simply would not have lead one of ordinary skill in the art to add sodium octyl sulfate to Hartog's superpolishing slurry for polishing glass disk substrates (for which the formation of hydrophilic surfaces is not sought).

The Roberts reference is cited for its alleged teaching that "surfactant such as sodium octyl sulfate is used in a colloidal silica composition for changing the surface chemistry and resulted surface is more susceptible to the surface processing (col. 1, lines 49-60 and col. 2, lines 46-53)." However, the teaching of the Roberts reference regarding its surfactants is not as all-encompassing as the Examiner purports. Rather, the Roberts reference merely teaches that in some applications it may be desirable to add a surfactant (i.e., sodium octyl sulfate being listed as a preferred surfactant) to its hydrophilizing composition to speed the formation of a hydrophilic surface on a hydrophobic surface, such as that of wax or synthetic fibers. See, for example, Roberts, col. 2, lines 45-52. As noted in the Roberts reference, "[t]here is a need to render hydrophilic normally hydrophobic surfaces, for example, synthetic fibers such as polyethylene terephthalate, and apparels made therefrom, to wick water away from the body; hydrophobic synthetic films, such as polyester and polyolefin films, to permit wetting of the film and hydrophobic wax surfaces in investment casting uses to achieve adhesion of the mold binder composition to the wax pattern." See, for example, Roberts, col. 1, lines 38-45.

It would not have been obvious to apply the teaching of the Roberts reference to the Hartog et al. reference as suggested by the Examiner for at least the three following

reasons. First, the hydrophilizing composition (i.e., a hydrophilizing composition based on aqueous colloidal silica in combination with zirconyl salts) disclosed in the Roberts reference is different and performs a different function than the superpolishing slurry disclosed in the Hartog et al. reference. Second, the Roberts reference teaches adding sodium octyl sulfate to its hydrophilizing composition for a purpose (i.e., speeding the hydrophilizing function of the hydrophilizing composition) that is inapplicable to the superpolishing slurry disclosed in the Hartog et al. reference. Third, the hydrophilizing composition disclosed in the Roberts reference operates on different surfaces (i.e., hydrophobic surfaces, such as synthetic fibers and wax) than the glass disk substrates operated on by the superpolishing slurry disclosed in the Hartog et al. reference.

Therefore, the Applicants respectfully request reconsideration and withdrawal of this rejection of claims 41-44 under §103(a).

III. Rejection of Claims 45-50 Under 35 U.S.C. §103(a)

At pages 5-6 of the third final Office Action, claims 45-50 are rejected under 35 U.S.C. §103(a) as being unpatentable over Hartog et al. (U.S. Patent No. 6,236,542) in view of Kuroda (U.S. Patent No. 6,268,979) and further in view of Burton et al. (U.S. Patent No. 6,083,838).

The Applicants respectfully submit that the Hartog et al., Kuroda and Burton et al. references, alone and in combination, fail to disclose or suggest the invention as recited in claims 45-50.

Independent claim 45 is directed to the "adsorbed" surfactant embodiments of the present invention, **wherein the surfactant is an ethylene oxide propylene oxide block**

copolymer surfactant. In this regard, independent claim 45 requires specific interaction between the ethylene oxide propylene oxide block copolymer surfactant and an aluminosilicate glass substrate for use in a data storage device. The specific interaction claimed is that the ethylene oxide propylene oxide block copolymer surfactant is adsorbed onto a surface of at least one of the aluminosilicate glass substrate and the colloidal silica particles, and that the ethylene oxide propylene oxide block copolymer surfactant has a hydrophobic section that forms a steric hindrance barrier between the aluminosilicate glass substrate and the colloidal silica particles.

Independent claim 50 is directed to the **"textured surface"** embodiments of the present invention, **wherein the surfactant is an ethylene oxide propylene oxide block copolymer surfactant**. In this regard, independent claim 50 requires specific interaction between the ethylene oxide propylene oxide block copolymer surfactant and an aluminosilicate glass substrate for use in a data storage device. The specific interaction claimed is that the ethylene oxide propylene oxide block copolymer surfactant is adsorbed and/or precipitated onto a surface of at least one of the aluminosilicate glass substrate and the colloidal silica particles, and that the ethylene oxide propylene oxide block copolymer surfactant has a hydrophobic section that forms a steric hindrance barrier between the aluminosilicate glass substrate and the colloidal silica particles.

The Hartog et al., Kuroda and Burton et al. references, alone and in combination, fail to teach the use of an ethylene oxide propylene oxide block copolymer surfactant to form a steric hindrance barrier between an aluminosilicate glass substrate and colloidal silica particles as required by each of independent claims 45 and 50.

Although the Burton et al. reference teaches the addition of propylene oxide ethylene oxide block copolymer surfactant to a metal CMP slurry to inhibit "oxide erosion" of metal stacks on a semiconductor wafer by reducing the rate of exposure of a metal (on the semiconductor wafer) to an oxidant (in the metal CMP slurry), the purpose of the addition of the propylene oxide ethylene oxide block copolymer surfactant in the Burton et al. reference is inapplicable to the superpolishing process and slurry disclosed in the Hartog et al. reference. See, for example, Burton et al., col. 2, lines 49-59 and col. 4, line 64 - col. 5, line 12. This teaching of the Burton et al. reference is inapplicable because the Hartog's superpolishing process and slurry is utilized for polishing disk substrate surfaces that have no metal stacks to be damaged or destroyed by oxide erosion.

The Burton et al. reference includes the following discussion about the problem of "oxide erosion", which occurs when semiconductor wafers are subjected to metal CMP.

> During metal CMP, areas dense in features (i.e., alignment marks) tend to oxidize at a faster rate than areas with sparse distributions. This uncontrollable oxidation of the metals forming the alignment marks is commonly referred to as oxide erosion. Additionally, manufacturers have observed that oxide erosion in dense arrays increases dramatically as batch sizes are increased. In such instances, the alignment marks may be either completely destroyed or severely damaged by this erosion. Whether damaged or destroyed, the alignment marks are useless once altered by the erosion since they are no longer optically aligned parallel to the directions of the stage motion. (Burton et al., col. 1, line 62 - col. 2, line 6.)

The Burton et al. reference proposes to overcome the problem of oxide erosion by reducing the rate of exposure of the metal to the oxidant in various ways. Adding a surfactant to the CMP slurry is one of the ways the Burton et al. patent proposes to reduce the rate of exposure of the metal to the oxidant. See, for example, Burton et al., col. 2, lines 49-59 and col. 4, line 64 - col. 5, line 12. However, one of ordinary skill in the art would not have applied this teaching of Burton et al. reference to Hartog's superpolishing

process and slurry which do not present the problem of oxide erosion, i.e., Hartog's superpolishing process and slurry are utilized for polishing disk substrate surfaces that have no metal stacks to be damaged or destroyed by oxide erosion.

In this regard, the rejection states the following.

> Modified Hartog et al fail to teach the use of claimed surfactant such as an ethylene oxide propylene oxide block polymer.
>
> However, Burton et al discloses a CMP slurry composition containing abrasive and surfactant is used to increase the polishing capability by increasing the viscosity of the slurry, wherein the surfactant is propylene oxide-ethylene oxide block copolymer (col.3, lines 62-65 and col.4, line 64-col.5, line 9).
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> Therefore, it would have been obvious to one of ordinary skilled in the art at the time of claimed invention to combine Burton et al's teaching into modified Hartog et al's teaching for increasing the polishing efficiency by introducing the improved surfactant as taught by Burton et al. (Third final Office Action, page 5, line 18 - page 6, line 6.)

However, the Examiner is taking this teach of the Burton et al. reference and applying it outside of the context of oxidation erosion, i.e., the problem that the Burton et al. reference purports to solve by adding a surfactant to a metal CMP. Burton's teaching of adding propylene oxide ethylene oxide block copolymer surfactant to a metal CMP slurry to inhibit oxide erosion of metal stacks on a semiconductor wafer, clearly would not lead one of ordinary skill in the art to add to ethylene oxide propylene oxide block copolymer surfactant to Hartog's superpolishing slurry for polishing disk substrate surfaces (which have no metal stacks to be damaged or destroyed by oxide erosion).

Moreover, independent claim 50 additionally requires that the colloidal particles have a specified nominal size to provide a **"textured surface"** on a disk substrate for use in a data storage device. Texturing is not taught in the Hartog et al. reference, the Kuroda

reference, or the Burton et al. reference. Although the specified nominal size of the colloidal particles (i.e., 70-200 nm) set forth in claim 50 is within the definition of what constitutes a "colloidal particle" set forth in the Hartog et al. reference (i.e., 1-1000 nm), the Hartog et al. reference teaches away from using large colloidal particles. For example, at col. 6, line 32, the Hartog et al. patent states, "The smaller the particles the better." At col. 6, lines 36-37, the Hartog et al. reference states, "For these reasons, soft colloidal particles of intermediate size were chosen for slurry 500." Likewise, in each of the examples in the Hartog et al. reference, the colloidal particles are smaller than the specified nominal size of the colloidal particles (i.e., 70-200 nm) set forth in claim 50.

It is important to note that the teachings of the Hartog et al. reference are in the context of superfinishing -- not texturing. This is the reason that the Hartog et al. reference limits the colloidal particles in its slurry to an intermediate size. Texturing, which is mentioned nowhere in either the Hartog et al., Kuroda reference, or Burton et al. references, requires larger colloidal particles. Texturing in the context of finishing disk substrates is important because it provides a circumferential texture pattern on the surface of the disk substrate that improves the magnetic characteristics of the magnetic data storage disk fabricated from the substrate. See, for example, the discussion at page 31, lines 7-13 of the specification.

Therefore, the Applicants respectfully request reconsideration and withdrawal of this rejection of claims 45-50 under §103(a).

IV. Conclusion

In view of the foregoing comments, the Applicants respectfully submit that all of the pending claims (i.e., claims 41-50) are in condition for allowance and that the application should be passed to issue.

If a conference would be of value in expediting the prosecution of this application and avoiding the delay of an appeal process, the Examiner is hereby encouraged to telephone the undersigned counsel at (847) 462-1937 to arrange for such a conference.

Respectfully submitted,

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